WEATHER, FORECASTS, AND WARNINGS.

By H. C. FRANKENFIELD, Professor of Meteorology.

At the beginning of the month, and continuing for several days, barometric pressure was moderately low over the great central valleys and the lake region, and in consequence frequent showers occurred over practically all districts from the Rocky Mountains to the Atlantic coast, with general and heavy rains over the Plains States, the lower Mississippi Valley, and in the Atlantic States from Pennsylvania to Florida. In the last-named districts the rains afforded permanent relief from the drought that had existed for a prolonged period, especially in the Carolinas, Virginia, and southern Maryland. The temperature during the first week of the month averaged near or below the normal as a rule, except in Texas, the Lake region, and the upper Ohio Valley, where there were several warm days. However, no extremely high temperatures prevailed in any part of the country.

On August 6 the following weekly forecast was issued:

The distribution of atmospheric pressure, as shown by the weather chart of the Northern Hemisphere, is such as to indicate that there will be no unseasonably warm weather in any part of the country during the coming week, and temperatures will average near or below the normal generally. The precipitation during the week will be local, but fairly well distributed over the greater part of the country from the Rocky Mountains to the Atlantic coast. The principal barometric depression to cross the country during the week is now forming over the western Plateau region; it will cross the Middle West about Wednesday, and the Eastern States Friday or Saturday.

During the first half of the second week of the month a low area moved east-northeastward from the Rocky Mountains to the lower St. Lawrence Valley, and it was followed by a high area from the Northwest that reached the Atlantic coast on August 10. At the same time comparatively low pressure continued over the Central West, and the result was a week of unsettled weather over the northern half of the country east of the Rocky Mountains with frequent thunderstorms. Dry weather continued in the southwestern portion of the country except along the mountain slopes, while in the East Gulf and South Atlantic States thundershowers were of daily occurrence, except along the south Atlantic coast. During the afternoon of August 11 a severe storm of very limited area touched the Gulf coast near Pensacola and Mobile Bay, causing high winds in that immediate vicinity, with some minor damage to shipping, etc., at Pensacola. At this place the wind reached a velocity of 80 miles from the southeast early in the evening of August 11, while at Mobile the highest velocity was but 34 miles an hour, indicating the local character of the storm, which dissipated a short distance in the interior during the morning of August 12.

There was a moderate cool wave over the northwestern districts during the early days of the week, reaching the Lake region during Thursday and Friday, August 10 and 11, but with these exceptions high temperatures prevailed east of the Rocky Mountains, with readings above 100° of frequent occurrence, except in the South Atlantic and east Gulf States, where the showers prevented any extreme heat. West of the Rocky Mountains the weather was fair and cool, except in the interior of the extreme Southwest, where temperatures were high.

On August 13 the following weekly forecast was issued:

The distribution of atmospheric pressure over the Northern Hemisphere is such as to indicate that moderately high temperatures will prevail the first half of the week in the Middle West and until the last of the week in the Eastern States; in the Southern States and on the Pacific slope normal temperatures are probable. A change to lower temperature will overspread the Northwestern States Tuesday and Wednesday, the Middle West Wednesday or Thursday, and the Eastern States by the last of the week. The principal barometric disturbance to cross the country during the week is now over the far Northwest. It will move eastward over the Middle West about Wednesday, and reach the Eastern States about Friday. It will be preceded and attended by considerable cloudiness and local showers and thunderstorms.

There were no pronounced barometric phenomena during the week, except over New England. A very moderate depression from extreme northern Illinois, after reaching the New England coast, developed into a pronounced disturbance during the night of August 15–16, but fortunately without high winds, so far as reports indicated. There was also a marked redevelopment of a disturbance in the same locality during the night of August 18–19, again without high winds. Both of the disturbances moved off to the northeastward, and the moderate high area following the second one brought with it a sharp temperature fall over the eastern portion of the country, the cool weather continuing for several days.

Only scattered showers occurred west of the Mississippi River, although over portions of the lower Mississippi Valley and the west Gulf States they were heavy at times, and the precipitation for the week was in excess of the normal amount. There were heavy thunderstorms on the 15th over the northeastern districts and good showers again on the 18th, so that the total precipitation for the week was somewhat in excess of the average. There were also frequent showers in the South Atlantic and east Gulf States.

At the beginning of the week temperatures were quite high east of the Rocky Mountains, but about the middle of the week a moderately high pressure area from the Northwest moved eastward, and by Saturday, August 19, comparatively cool weather prevailed over the northern districts from the Rocky Mountains to New England. In the central Plains States and the Southwest high temperatures continued. West of the Rocky Mountains the week was cooler, with generally fair weather, except over the extreme southern districts, where the temperatures were high.

On Sunday, August 20, the following bulletin was issued:

Fair weather with moderate temperature will continue Monday and Tuesday in the lower Lake region, the Middle Atlantic States, and New England. A disturbance now over the Northwest will move eastward, preceded and attended by showers and rising temperature that will cover the Northwest and the central Plains States Monday and Tuesday, with showers continuing Tuesday in the latter district; the Missouri and upper Mississippi Valleys and the upper Lake region by Tuesday, reaching the Middle Atlantic States and New England Wednesday and Thursday. The disturbance will be followed by a high area now on the north Pacific coast, bringing with it falling temperatures that will reach the Northwestern States Monday and Monday night, the great central valleys and the upper Lake region Tuesday or Wednesday, and the eastern portion of the country Thursday and Friday. Generally fair weather will prevail after Wednesday in the

central West, and after Tuesday in the extreme West, except in the central and southern Rocky Mountain region, where local showers are probable. In the South Atlantic and east Gulf States local showers will continue, while in the west Gulf States the weather will be generally fair. Another low area will probably appear in the British Northwest toward the end of the week, attended by rising temperature in the Northwestern States.

Subsequent conditions were in accordance with the forecast, except that showers continued locally in the Plains States and the Northwest during the middle of the week and were of frequent occurrence in eastern Texas during the second half of the week. The northwestern high-pressure area was accompanied by a decided drop in temperature, and frosts occurred quite generally in the Northwestern States and Wyoming from August 23 to 28, inclusive. Heavy to killing frosts occurred on August 27 and 28, and on August 29 light frosts occurred in northern Wisconsin and the Lake Superior region.

The feature of the week was a hurricane that, as closely as could be conjectured from later reports, originated in the Atlantic Ocean about August 23 at about latitude 24° and longitude 67° 30′. The first definite indications of its approach toward the coast were noted on Sunday morning August 27, at Charleston, S. C., when the barometer read 29.82 inches, a fall of 0.14 inch in 12 hours, with a wind velocity of 22 miles an hour from the North. At the same time the barometer at Savannah, Ga., read 29.90 inches, a fall of 0.04 inch in 12 hours, with a wind velocity of 20 miles an hour from the Northwest. Advisory warnings were sent at once to these places, and special observations called for. At 11 a. m. storm warnings were ordered from Fort Monroe to Savannah, and all coast stations from Boston to New Orleans and the meteorological offices at Habana, Cuba, notified accordingly. Later special observations indicated that the storm would be a severe one, and hurricane warnings were ordered at 3.45 p. m. for Charleston and Savannah, and northwest storm warnings ordered at Jacksonville, Fla. The storm center apparently moved very slowly in a west-northwest direction, and it was not until 8 a. m., Monday, August 28, that it reached the coast at a point a short distance north of Savannah.

The lowest barometer readings were as follows: Charleston, 29.30 inches, at 11.50 p. m., August 27, and Savannah, 29.02 inches, at 8 a. m., August 28. The highest wind velocity at Charleston was about 106 miles an hour from the northeast at 11.50 p. m., August 27, and at Savannah, 88 miles from the northwest at 3.10 a. m., August 28, with an extreme velocity of 96 miles an hour at 3.08 a. m The storm path was of limited width, and no high winds were reported north of Wilmington, N. C., or south of Jacksonville, Fla. At Wilmington the wind attained a velocity of 30 miles an hour from the east early in the afternoon of Sunday, August 27, and at Jacksonville 48 miles an hour from the northwest early in the afternoon of Monday, August 28. Great damage was caused by the winds and high tides between Charleston and Savannah, and the loss of seven lives was reported. More detailed accounts of the storm will be found in the report of the district editor in another portion of this Review and also in the special bulletin immediately following.

The storm began to diminish in intensity after reaching the coast, and in the interior of the State of Georgia recurved to the northeastward and passed to sea off the New Jersey coast. The storm was followed by a cold high area from the northwest and strong northeast to east winds and general rains set in along the Atlantic coast from Nantucket to Hatteras, with cool weather prevailing over the eastern half of the country.

On Sunday, August 28, the following special bulletin was issued:

A barometric depression that is central over the Mississippi Valley and another that is off the south Atlantic coast will move toward New England and be attended by general rains within the next 48 hours over the greater part of the country from the Mississippi Valley to the Atlantic coast and in the Southwest. It is probable that strong winds will prevail off the Atlantic coast. Following the passage of these disturbances the pressure will rise rapidly and a change to considerably cooler weather will overspread the Great Central Valleys and the Lake region Monday and Monday night and the eastern and southern States Tuesday and Wednesday. This change to cooler weather will probably cause frosts in exposed places the first part of the week in the northern Rocky Mountain region, the northern plains States, the extreme upper Mississippi Valley, and the upper lake region. Another disturbance is due to appear in the northwest about Wednesday, whence it will move eastward and cross the Middle West Thursday or Friday and the Eastern States near the close of the week; this disturbance will be preceded by a reaction to warmer weather and be attended by considerable cloudiness and local areas of precipitation in the region east of the Rocky Mountains.

INTERNATIONAL PRESSURE.

Except on one or two days pressure was high over Alaska until August 24, when a period of moderately low pressure set in, continuing until the end of the month. Over the Atlantic Ocean pressure was variable within narrow limits, and nearly normal except from August 19 to 22, inclusive, when it was low over the Azores, and after August 21 when high pressure prevailed over the islands of Bermuda.

Nothing unusual developed in the West Indies. Over Iceland and the British Isles marked low pressure and storm conditions prevailed from August 4 to 8, inclusive, followed by a reaction to abnormally high pressure (30.40 inches), and a gradual decrease after August 15. From August 24 to 29, inclusive, pressure was again low over the British Isles, but nearly normal over Iceland until the last day of the month, when there was a very rapid fall of 0.9 inch to 28.84 inches, the fall extending over the extreme northeast Atlantic Ocean and the northern portion of the British Isles.

Over continental Europe high pressure prevailed during the first half of the month except over the extreme southern portion, followed then by a fall that was most marked over Russia from August 15 to 21, inclusive. There was a gradual recovery to more normal conditions after August 21. Over Siberia pressure was variable within a moderately wide range, with a well-defined low period from August 11 to 16, inclusive, and a lesser one about the middle of the first decade of the month. During the second half of the month the tendency was toward conditions somewhat above the normal.

On the Asiatic coast pressure was also variable, but within narrow limits, except for a pronounced depression on August 11 in the Yellow Sea. Over the Philippines pressure was above normal as a rule, but well marked depressions were noted on August 1, 10, and 25. Over the Sandwich Islands moderately low pressure prevailed.

Average temperature and departure from the normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures, current month.	Accumulated since Jan. 1.	Average since Jan. 1.
New England	12	67.3	+0.2	+ 4.7	+0.6
Middle Atlantic	15	73.7	+1.1	+ 7.9	+1.0
South Atlantic	10	79.0	+1.2	+12.9	+1.6
Florida Peninsula [1]	8	80.7	−0.4	+10.7	+1.3
East Gulf	11	79.6	+0.4	+19.0	+2.4
West Gulf	10	81.8	+1.0	+22.7	+2.6
Ohio Valley and Tennessee	13	75.5	+0.7	+16.7	+2.1
Lower Lakes	10	70.1	+0.6	+13.1	+1.6
Upper Lakes	12	65.7	−0.3	+21.4	+2.7
North Dakota [1]	9	66.2	−4.0	+ 0.4	0.0
Upper Mississippi Valley	14	71.9	−0.9	+22.1	+2.8
Missouri Valley	12	73.0	−0.7	+26.8	+3.4
Northern Slope	9	63.6	−3.2	+ 3.8	+0.5
Middle slope	6	75.2	0.0	+23.0	+2.9
Southern slope [1]	8	81.3	+1.5	+25.1	+3.1
Southern Plateau [1]	10	78.2	+0.3	− 0.3	0.0
Middle Plateau [1]	10	68.5	−1.0	+ 3.6	+0.4
Northern Plateau [1]	11	66.2	−1.2	− 2.9	−0.4
North Pacific	7	60.6	−0.5	− 9.2	−1.2
Middle Pacific	5	64.0	−2.7	−10.7	−1.3
South Pacific	4	69.6	−1.0	− 0.6	−0.1

[1] Regular Weather Bureau and selected cooperative stations.

Average precipitation and departure from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
New England	11	5.05	131	+1.2	− 3.8
Middle Atlantic	15	7.63	176	+3.3	− 4.1
South Atlantic	11	7.06	115	+0.9	−14.6
Florida Peninsula [1]	8	8.09	114	+1.0	− 9.2
East Gulf	11	4.70	96	−0.2	− 5.2
West Gulf	10	4.19	140	+1.2	− 4.2
Ohio Valley and Tennessee	13	4.43	129	+1.0	− 3.2
Lower Lakes	10	3.93	130	+0.9	− 1.1
Upper Lakes	13	2.18	73	−0.8	− 1.5
North Dakota [1]	9	3.38	155	+1.2	+ 0.2
Upper Mississippi Valley	15	3.84	119	+0.6	− 3.9
Missouri Valley	12	3.32	103	+0.1	− 6.6
Northern Slope	9	1.40	108	+0.1	− 2.1
Middle slope	6	2.45	100	0.0	− 3.7
Southern slope [1]	8	1.44	62	−0.9	− 3.7
Southern Plateau [1]	10	0.72	51	−0.7	+ 2.0
Middle Plateau [1]	11	0.60	60	−0.4	+ 0.4
Northern Plateau [1]	11	0.48	100	0.0	− 2.3
North Pacific	7	0.23	28	−0.6	+ 6.7
Middle Pacific	8	0.01	100	0.0	+ 3.5
South Pacific	4	0.00	100	0.0	+ 7.4

[1] Regular Weather Bureau and selected cooperative stations.

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	81	− 1	Missouri Valley	67	0
Middle Atlantic	77	+ 1	Northern slope	61	+ 9
South Atlantic	81	− 1	Middle slope	61	+ 2
Florida Peninsula	79	0	Southern slope	58	− 3
East Gulf	82	+ 2	Southern Plateau	43	+ 1
West Gulf	73	− 2	Middle Plateau	36	+ 3
Ohio Valley and Tennessee	74	+ 2	Northern Plateau	38	− 5
Lower Lakes	73	+ 2	North Pacific	75	+ 8
Upper Lakes	75	0	Middle Pacific	63	− 4
North Dakota	74	+10	South Pacific	64	− 2
Upper Mississippi Valley	72	+ 2			

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.8	+0.8	Missouri Valley	4.1	0.0
Middle Atlantic	5.4	+0.3	Northern slope	4.5	+0.6
South Atlantic	5.4	+0.2	Middle slope	3.9	+0.1
Florida Peninsula	5.8	+0.4	Southern slope	3.5	+0.4
East Gulf	6.0	+0.8	Southern Plateau	2.5	−1.2
West Gulf	4.1	+0.1	Middle Plateau	2.2	−1.1
Ohio Valley and Tennessee	5.8	+1.3	Northern Plateau	2.5	+0.2
Lower Lakes	5.4	+0.8	North Pacific	5.2	+0.6
Upper Lakes	5.1	+0.4	Middle Pacific	3.8	+0.2
North Dakota	5.2	+1.2	South Pacific	1.8	+1.0
Upper Mississippi Valley	5.0	+0.8			

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Cape Henry, Va	18	58	ne.	Pensacola, Fla	11	80	se.
Charleston, S. C	27	94	e.	Do	12	56	s.
Do	28	58	se.	Point Reyes Light, Cal	1	62	nw.
Columbus, Ohio	17	60	w.	Do	2	52	nw.
Devils Lake, S. Dak	13	53	w.	Do	8	54	nw.
El Paso, Tex	22	50	sw.	Do	16	62	nw.
Marquette, Mich	21	56	s.	Do	17	60	nw.
Mount Tamalpais, Cal	7	55	nw.	Do	18	54	nw.
Do	16	51	nw.	Do	19	62	nw.
Do	17	56	nw.	Savannah, Ga	27	62	nw.
New York, N. Y	15	55	nw.	Do	28	88	nw.
Do	18	64	nw.	Walla Walla, Wash	14	50	sw.
Oklahoma, Okla	4	60	w.	Williston, N. Dak	13	59	nw.
Pensacola, Fla	10	58	se.				